DOCUMENT RESUME

ED 028 153 SP 002 488

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Pub Date [66]
Note-14p.
EDRS Price MF-$0.25 HC-$0.80
Descriptors-*Behavior Patterns, Interaction Process Analysis, Secondary School Teachers, *Teaching Techniques
Identifiers-Flanders System of Interaction Analysis, Interaction Sequence Graph

Three secondary school teachers (A, B, and C) participated in a study to determine if teachers use a repeating pattern of verbal instructional techniques and if there are common instructional patterns among teachers. Sixteen observation records of interaction sequences for each teacher showed that teacher A exhibited the most complex system of verbal instructional techniques characterized by a very rapid rate of teacher pupil interaction; teacher B (displaying patterns intermediate between teachers A and C) was characterized by a lecture-question-answer sequence with a great number of student-initiated responses; and teacher C had a consistent, recurring pattern of extended lecture with short student responses to questions. An Interaction Sequence Graph (based on Flanders' 10 categories of interaction) was constructed from observation records. Comparisons of the teachers' patterns in the graphs (made in terms of those sequences which appeared in every observation record, those which appeared in half, and those which appeared in less than half) showed that each teacher did exhibit a repeating pattern of verbal instructional techniques, but because each teacher exhibited such diversity, it was not possible to demonstrate a common pattern among all three teachers. (A seven-item bibliography is included.) (See also SP 002 474). (SM)

ED028153

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A STUDY OF RECURRING PATTERNS OF TEACHING

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This report is based upon a doctoral research study completed at the University of Nebraska, August, 1966.

SP002488

This study was designed to gather descriptive data concerning two questions:

1. Does a teacher use a repeating pattern of verbal instructional techniques?

2. Are there common kinds of instructional patterns among teachers?

Observational data were collected by the use of Flanders' ten-category interaction observation technique, although matrix analysis commonly associated with this technique was not used. Each observational record was used to construct an Interaction Sequence Graph. The Interaction Sequence Graph simultaneously displays all behavioral events encoded during a period of observation in a way which permits sequences of verbal behavior to be classified and analyzed for the presence of verbal instructional patterns.

Observational data were collected from three teachers of sophomore high school biology. All teachers had over seven years of teaching experience. Each teacher selected two consecutive periods for observation. Each period was observed eight times producing a total of 16 observational records for each teacher. The first observational record of each period was discarded as an allowance for acclimatization by the observer, the teacher, and the students.

Pattern Analysis

The Interaction Sequence Graph was constructed according to 17 conventions. Operational definitions were established for the terms, series, sequence, system, and patterns. The graphical sequences were classified according to 10 major classes with a number of class subdivisions.

TABLE 1

THE INTERACTION SEQUENCE GRAPH

9 (student initiated ideas)
8 (student response to teacher)
3 (teacher responding to student ideas)
4 (teacher asking questions)
5 (teacher lecturing)
----------time----------

Categories 1, 2, 6, 7, and 10(0) were randomly placed.

TABLE 2

SEQUENCE CLASSES AND SUBDIVISIONS

Class	Subdivision*
5 - 8	S M L X
5-4-8	S M L X
4-8	None
3-8	S M L X
n-8	None
5 - 9	S M L X
5-4-9	S M L X
4-9	None
3-9	S M L X
n-9	None

Miscellaneous (Notations were made of the appearance of extended series 3, 8, and 9. Several partial sequences such as 5-3-5 were noted also.)

*The time duration for subdivided sequence classes was designated as short (S), medium (M), long (L), and extended (X). Specific ranges of time were assigned to each designation.

From this analysis it was possible to select a representative graph which seemed to contain the least variation from all other graphs. This "best fit" graph was then used for descriptive and comparative purposes.

Verbal Patterns Exhibited by Each Teacher

Teacher A

Teacher A exhibited the most complex system of verbal instructional techniques of the three teachers. The observational records ranged from 38 minutes to 52 minutes in length and exhibited from 99 to 173 interaction sequences per observational record. The observed rate of occurrence of sequences ranged from one in 7.5 seconds (eight per minute) to one in 3.5 minutes. The averaged rate per period ranged from 2.1 to 3.7 sequences per minute. A major behavioral pattern characterizing this teacher was a very rapid rate of teacher-pupil verbal interaction.

A second characteristic pattern was the use of group or unison student responses (graph notation, *). Group responses recurred from 8 to 98 times per period. They were usually associated with Category 8, a teacher directed response. In 9 of the 14 observational records these group responses recurred 33 or more times. The ratio of group responses to individual responses in those 9 records ranged from 40/139 (0.29) to 98/167 (0.59).

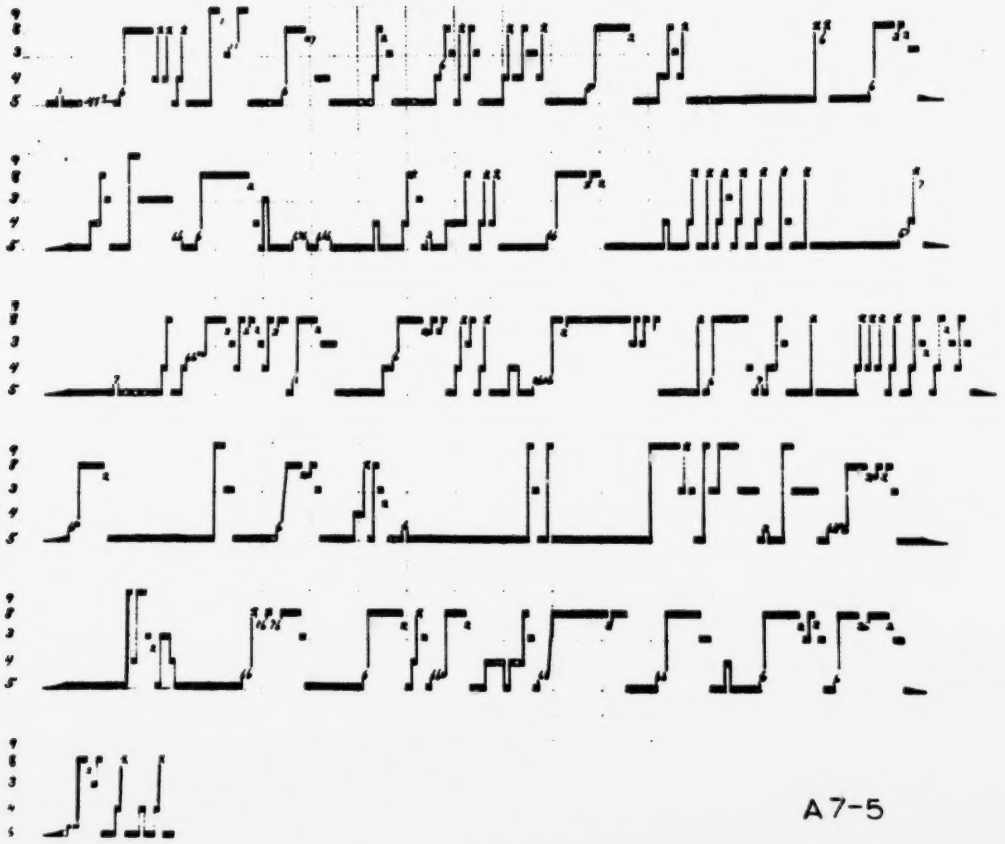
Sequence class 5 - 9 (lecture followed by a student-initiated idea) appeared in every observational record with a range of 4 to 29 recurrences. This indicates that students were allowed to break in on teacher discourse with some degree of regularity. Sequence class 3-9 (teacher development of a student idea followed by further student initiation) occurred in one half of the records. This indicates that the teacher often responded to student ideas in ways which permitted students to initiate further ideas.

The usual classroom period began with a student reading and answering homework questions. This instructional pattern is reflected as an extended 8 series in the interaction sequence graph. Each student's response was frequently followed by short questions which often required unison responses. Another variation was to follow a student's response with abbreviated lecture-question-answer sequences (5-4-8). These sequences appeared to be very similar in instructional nature to the 5-8 sequences in which students responded without the teacher asking an overt question. Often voice inflection or a slight hesitation was used to indicate that a student response was expected. The analysis of these cues which seemed to generate such sequences was beyond the immediate scope of this study.

Portions of most sequence graphs indicated that Teacher A developed recitation content by the use of student-initiated responses. The frequent appearance of extended Category 3 (the teacher's development of a student's response) along with the use of 3-8 and 3-9 sequences indicates that Teacher A spent considerable time working with student ideas and questions. In addition the fairly frequent occurrence of the partial sequence 5-3-5 indicates that the teacher commonly referred to the ideas of students in the process of presenting new information.

Of the 14 observational records, 2 exhibited unexpected frequencies of recurrences of most sequence classes. These records contained twice the recurrence rate of student-initiated responses and also served to reveal differences between the interaction patterns of the two classes of students. On this particular day the usual class work had been replaced by the discussion of a television show on evolution. Teacher-student interaction increased dramatically in both classes, but the ratio of student-initiated ideas to students responding to teacher's questions was quite different between the two classes. This evidence supports the contention that, although the teacher may be the primary controlling factor in organizing classroom experiences, variations in the student population will certainly affect the observed patterns of interaction. Adequate sampling, both in terms of student variation and in terms of content presentation, is required in attempting to arrive at a generalized description of the characteristic patterns of teaching exhibited by a teacher.

GRAPH 8



A7-5

TABLE 8
SUMMARY OF GRAPH 8

Class	Occur-rences	Sequence duration S	M	L	X
5 - 8	26	14	8	3	1
5-4-8	29	14	10	4	1
4-8	13				
3-8	5				
n-8	16				
5 - 9	9	2	3	1	3
5-4-9	-				
4-9	1				
3-9	2	2			
n-9	-				

Miscellaneous Class	Occur-rences
Ext. 3	5
Ext. 8	21
Ext. 9	2
5-3-5	2
Total misc.:	30
Time span:	47 min.
Total sequences:	100

Graph A7-5 on the following page is presented as representative of the behavioral patterns exhibited by Teacher A.

Teacher B

Teacher B exhibited patterns intermediate between Teachers A and C. The observational records ranged from 48 to 53 minutes in length and exhibited 31 to 102 interaction sequences per period. Most observational records exhibited over 57 interaction sequences per period. [redacted]. The observed rate of interaction sequences ranged from 7 per minute to 1 in 7 minutes. Most records, 11 of 13, had averaged rates of 1 or more sequences per minute. Group responses occurred in only 3 records and were not considered to be a part of Teacher B's recurring instructional technique. Sequence classes 5-4-8, 4-8, 5 - 9, and 3-9 were the predominant sequence classes. Sequence classes ending in Category 9 series (student-initiated response) generally recurred more frequently than did sequence classes ending in Category 8 series. Analysis of these data indicate that verbal behavior sequences ending in student-initiated talk (questions and ideas) were a predominant recurring pattern.

The usual period of recitation began with the teacher's presenting an orientation lecture followed by a lecture-question-answer-question-answer pattern. Student-initiated responses tended to increase as the period progressed with a corresponding increase in the teacher's involvement with student ideas. At sporadic intervals, the teacher returned to presenting new information. The latter parts of the classroom period were often devoted to answering student questions and in dealing with supplementary material, although no regularly recurring pattern of events was apparent by observing the sequence graphs.

Students were often allowed to break in on the teacher's discourse, and the way in which the teacher developed the student ideas often resulted in additional student-initiated responses. The appearance of extended Category 3 series in every observational record with recurrence rates of 6 to 14 times per period indicates that this is a consistent pattern. Further evidence is the notation that the partial sequence 5-3-5, where the teacher refers to a student's idea in the course of a lecture, occurred in 8 of the 13 records.

The classroom records obtained from Teacher B also contained two unusual observational records collected during two class periods devoted to reviewing for a test. When summaries of the two class records were compared, it was noted that the student-initiated to teacher-initiated student response ratios were entirely different. The Period 2 record had a ratio of 2.3, while the Period 3 record had a ratio of 0.28. The duration of each observational record was 49 minutes. Both records contained similar numbers if interaction sequences (82 and 88).

Subsequent examination of recitation records revealed similar tendencies. Raw score comparisons revealed that all records of Period 2 contained from 1.8 to 4.3 times as many 9 series as 8 series. Anecdotal records revealed that Teacher B felt the Period 2 students to be much more responsive than the Period 3 students. Examination of the interaction sequence graph summaries corroborate Teacher B's feeling. As with Teacher A, this evidence tends to support the contention that different groups of students can significantly affect the pattern of instructional behavior exhibited by a teacher.

No one sequence graph was found which satisfied all of the system characteristics exhibited by Teacher B. The graph finally selected for Teacher B is representative of about one half of the observational records and for 8 of the 10 sequence classes. The graph contains a higher than usual number of student-initiated responses due to the presence of the extreme observed rates for sequence classes 3-9 and n-9. It is possible that the inability to find one graph more representative of all 10 sequence classes indicates an inadequate sample of the verbal patterns of Teacher B. Graph B2-5 on the following page was finally selected as most representative with the exceptions noted above.

Teacher C

Teacher C exhibited the least complex interaction record of the three teachers. Teacher C had a very consistent recurring pattern of verbal instructional techniques. The observational records ranged from 22 to 51 minutes in length and exhibited 18 to 86 interaction sequences per period. The observed rate of occurrence of sequences ranged from 1 in 8.5 seconds (7 per minute) to 1 in 8 minutes. The averaged rate per period ranged from 0.7 to 2.0 sequences per minute.

Group responses and Category 9 responses (student-initated response) rarely occurred and were not considered to be a part of Teacher C's recurring instructional pattern. The predominant repeating patterns of Teacher C consisted of a variety of sequences from class 5-4-8 intermingled with 4-8 sequences. Every period contained 3 to 12 lectures extending over 2 or more minutes.

Examination of sequence graphs revealed 3 consistent patterns of sequences.

1. The tendency of long and extended lecture-question-answer (5-4-8) sequences to follow one another in groups of 2 or 3.

2. A tendency of long or extended 5-4-8 sequences to be followed immediately by either short 5-4-8 or 4-8

GRAPH 21

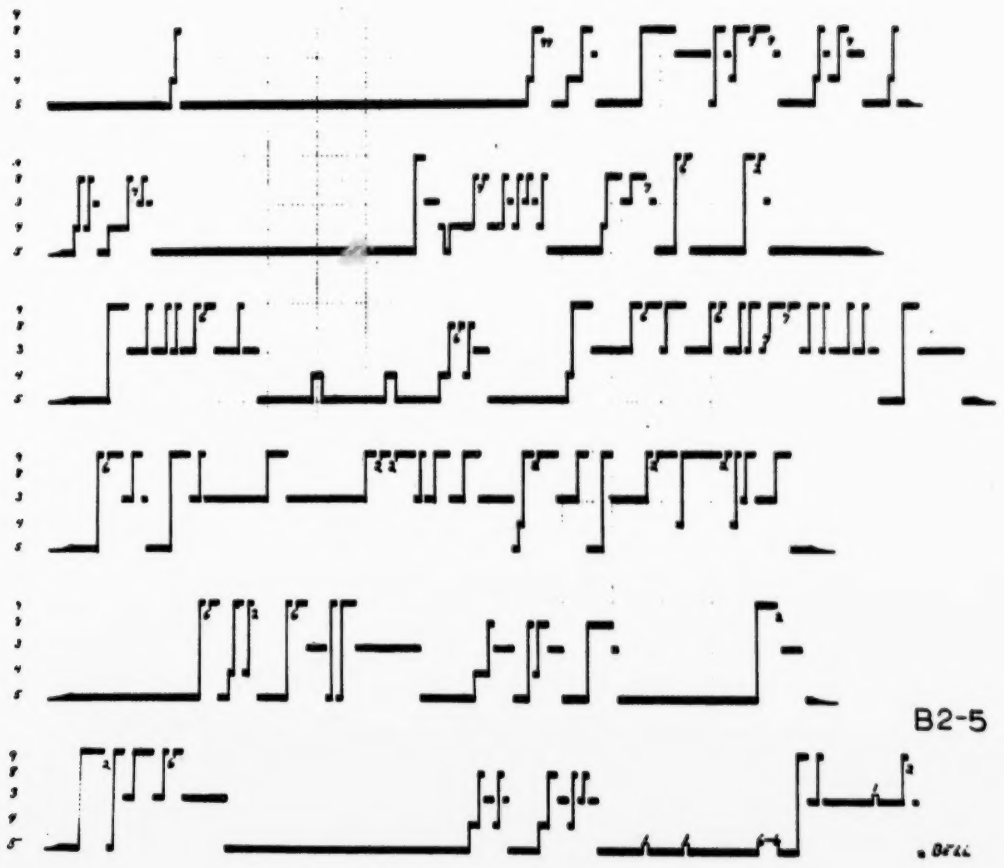


TABLE 21
SUMMARY OF GRAPH 21

Class	Occur-rences	Sequence duration S	M	L	X
5 - 8	3	1	2		
5-4-8	11	3	4	2	4
4-8	10				
3-8	4	4			
n-8	3				
5 - 9	18	6	5	2	5
5-4-9	3	2		1	
4-9	2				
3-9	30	16	9	2	3
n-9	15				

Miscellaneous Class	Occur-rences
Ext. 3	13
Ext. 8	1
Ext. 9	12
Total misc.:	26
Time span:	50
Total sequences:	99

sequences. Usually these short sequences occurred in groups of 2 or more.

3. And the consistent use of a short Category 3 series following a Category 8 student response.

There was a general lack of any extended (12 or more seconds) student response to questions. Extended lecture series were interrupted only 6 times in 5 of 14 observed periods.

Graph C4-5 on the following page represents the one interaction sequence graph selected as representative of the central tendencies as presented in the discussion of the recurring instructional patterns of Teacher C.

Verbal Patterns Found Common Among The Three Teachers

The three teachers exhibited such a diversity of patterns that it was not possible to identify common kinds of verbal instructional patterns in the terms and concepts of the study.

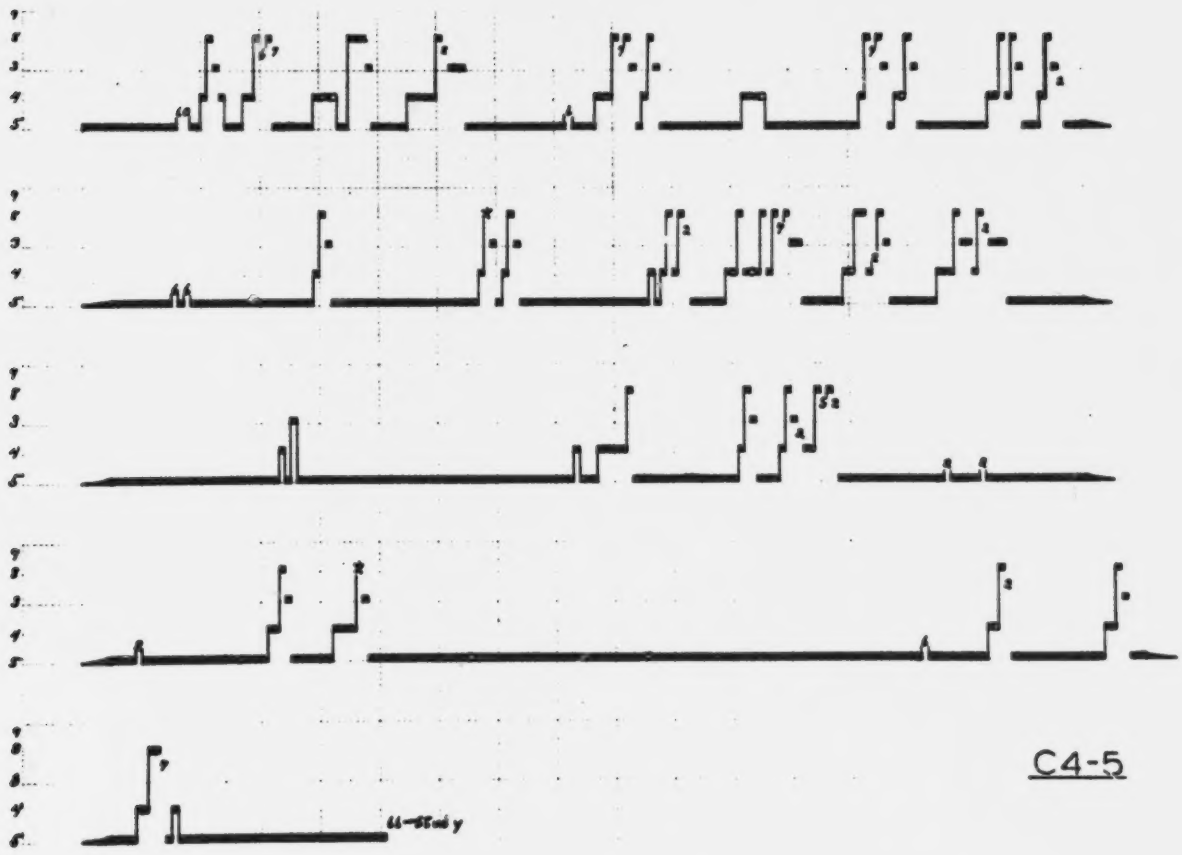
Comparisons of the three teachers' patterns were made in terms (1) of those sequence classes which appeared in every observational record, (2) those which appeared in one half but not all records, and (3) those which appeared in less than one half of the records.

These comparisons are presented in the table on the following page. The apparent "common" patterns are artifacts of the summarization table. It is necessary to compare each class subdivision to accurately compare the three teachers.

All sequence classes and most miscellaneous classes were found to occur in some of the observational records for each teacher. However, only 2 sequence classes, lecture-question-answer (5-4-8) and question-answer (4-8), were found to be common to all three teachers in every observational record. Examinations of other tabulations revealed that from 1/3 to over 1/2 of all sequences in every observational record were from these two classes. Examination of the interaction sequence graphs indicated that, although these two sequence classes were often coupled with each other, no regularly recurring system of couplets seemed to occur that was common to all three teachers.

Further comparisons were made by examining the subdivisions of each sequence class. Using the only two common sequence classes as a case in point, it was found that subdivisions of the 5-4-8 sequence class demonstrated considerable differences in the time duration of the series 5 part of the sequence. Teacher A typically used very short lectures and seldom lectured over 1 minute.

GRAPH 36



C4-5

TABLE 36
SUMMARY OF GRAPH 36

Class	Occurrences	Sequence duration S	M	L	X
5 - 8	-				
5-4-8	28	5	7	5	8
4-8	7				
3-8	-				
n-8	5				
5 - 9	-				
5-4-9	-				
4-9	-				
3-9	-				
n-9	-				

Miscellaneous Class	Occurrences
Ext. 3	2
Ext. 8	-
Ext. 9	-
Total misc.:	2
Time span:	38 min.
Total sequences:	30

TABLE 3

COMPARISONS OF THE THREE TEACHERS

Sequence Class	Teacher A	B	C
5 - 8	*	½	-
5-4-8	*	*	*
4-8	*	*	*
3-8	*	½	½
n-8	*	½	½
5 - 9	*	*	-
5-4-9	½	½	-
4-9	½	½	-
3-9	½	*	-
n-9	½	½	-
Extended Series			
3	*	*	-
8	*	½	-
9	½	*	-
Partial Sequence			
5-3-5	½	½	-

Key: (*) occurs in every observational record
(½) occurs in ½ but not all observational records
(-) occurs in less than half the records

Teacher B typically used lectures of 1 to 2 minutes in duration. Teacher C often used extended lectures of 2 or more minutes in duration. Teacher A used various combinations of the 5-4-8 and 4-8 sequences about 2/5 to 4/5 of the total number of sequences in any one observational record. Teacher B used them from about 1/3 to 1/2 of the total number of sequences. Teacher C used these two sequences almost to the total exclusion of all other sequences.

The only generalizations that could be supported after examination of all sequence graphs and graph summaries was that Teachers A and B exhibited a wider variety of verbal instructional patterns than did Teacher C. Teachers A and C were the most different, while Teacher B shared some characteristics with both Teachers A and C. Teachers A and B tended to have higher rates of interaction with and among students. Teachers B and C tended to have more long sequences of presenting information to the students.

Each teacher appeared to have an essentially unique approach to conducting the classroom. Teacher A was unique in the use of unison (*) student responses and in the rapid pace of teacher-student interaction. Teacher B's records exhibited the highest frequencies of student-initiated responses. Teacher C was unique in the almost exclusive appearance of sequence classes 5-4-8 and 4-8.

It was concluded that more variability than similarity was found in the patterns of verbal instructional techniques exhibited by these three teachers.

Conclusions

This study sought to extend existing concepts concerning the nature of teaching and the ways in which descriptions of teaching can be supported by objective evidence. The primary difference in the descriptions obtained in this study from the narrative descriptions which a skilled observer not using this technique might produce is the nature of the evidence preserved and presented to support the description.

The results of this study support the tentative conclusion that one aspect of teaching is a system of actions which can be described in terms of the relationships between sequences of verbal behavioral events. Descriptions of patterns of verbal patterns of teaching behavior can be obtained through the study of Interaction Sequence Graphs, the graph summaries, and a representative graph obtained by an analysis of observed variability.

It was determined that for these three biology teachers, each teacher did exhibit a repeating pattern of verbal instructional

techniques. It was not possible to demonstrate any common kinds of verbal instructional patterns among all three teachers according to the concepts and methodology of the study.

Descriptions of verbal teaching behavior, supported by evidence objectively obtained and readily presented for independent examination, should aid in obtaining more reliable correlations between teaching methods and other dimensions of the classroom. Informal and limited use of the sequence graph indicates that it is not only an adequate research device, but also a very effective supervisory tool in working with student teachers.

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